

IN THE CLAIMS

Please amend claims 1, 21, 22, and 25 as follows.

1 1. (Currently amended) A method of driving a 3-electrode plasma display apparatus, the

2 method comprising:

3 converting an external analog video signal into a digital signal to generate an internal video
4 signal;

5 generating drive control signals at a controller in response to the internal video signal;

6 processing an X-drive control signal output from the controller and applying the result of said
7 processing of the X-drive control signal to X-electrode lines;

8 processing a Y-drive control signal output from the controller and applying the result of said
9 processing of the Y-drive control signal to Y-electrode lines;

10 processing an address signal at an address driver to generate display data signals and applying

11 the display data signals to address electrode lines, the address signal being output from the controller,

12 the apparatus including a 3-electrode plasma display panel, with the panel including the X-electrode

13 lines, Y-electrode lines, and address electrode lines, the X-electrode lines and Y-electrode lines being

14 alternately arranged in parallel on a rear surface of a front transparent substrate to form XY-electrode

15 line pairs, the address electrode lines being arranged on a front surface of a rear transparent substrate

16 to cross the XY-electrode line pairs, with intersections of the XY-electrode line pairs and the address

17 electrode lines defining display cells;

18 controlling operation and non-operation of a power recovery circuit in accordance with the

19 display data signals to be applied to the address electrode lines, said power recovery circuit being

20 ~~included in the address driver;~~
21 predicting a first addressing power of the plasma display panel during a non-operation of a
22 power recovery circuit and operating the power recovery circuit when the first addressing power
23 exceeds a first predetermined reference value;
24 predicting a second addressing power of the plasma display panel during an operation of the
25 power recovery circuit and not operating the power recovery circuit when the second addressing
26 power exceeds a second predetermined reference value;
27 collecting excess charges remaining in the display cells upon said operation of said power
28 recovery circuit at the end of said applying the display data signals, said collecting excess charges
29 being performed by said power recovery circuit; and
30 applying the collected charges to the display cells upon said operation of said power recovery
31 circuit at the start of said applying the [[data]] display data signals.

1 2. (Previously Presented) A method of driving a 3-electrode plasma display apparatus, the
2 method comprising:
3 converting an external analog video signal into a digital signal to generate an internal video
4 signal;
5 generating drive control signals at a controller in response to the internal video signal;
6 processing an X-drive control signal output from the controller and applying the result of said
7 processing of the X-drive control signal to X-electrode lines;
8 processing a Y-drive control signal output from the controller and applying the result of said

9 processing of the Y-drive control signal to Y-electrode lines;

10 processing an address signal at an address driver to generate display data signals and applying

11 the display data signals to address electrode lines, the address signal being output from the controller,

12 the apparatus including a 3-electrode plasma display panel, with the panel including the X-electrode

13 lines, Y-electrode lines, and address electrode lines, the X-electrode lines and Y-electrode lines being

14 alternately arranged in parallel on a rear surface of a front transparent substrate to form XY-electrode

15 line pairs, the address electrode lines being arranged on a front surface of a rear transparent substrate

16 to cross the XY-electrode line pairs, with intersections of the XY-electrode line pairs and the address

17 electrode lines defining display cells;

18 collecting excess charges remaining in the display cells when said applying of the display

19 data signals ends, said collecting being performed by a power recovery circuit included in the address

20 driver;

21 applying the collected charges to the display cells when said applying of the display data

22 signals starts;

23 controlling operation and non-operation of the power recovery circuit in dependence upon

24 said applying of the display data signals to the address electrode lines;

25 uniformizing charges in display cells to be driven, said uniformizing corresponding to an

26 initialization step;

27 determining a charge state of display cells to be turned on and a charge state of display cells

28 to be turned off, said determining corresponding to an address step;

29 provoking the display cells to be turned on to perform a display discharge, said provoking

30 corresponding to a display-sustaining step; and

31 said uniformizing, determining, and provoking being performed in a unit subfield, the
32 operation and non-operation of the power recovery circuit being controlled in dependence upon the
33 display data signals applied to the address electrode lines in the address step.

1 3. (Original) The method of claim 2, with the operation and non-operation of the power
2 recovery circuit being controlled for each subfield in accordance with the display data signals of the
3 respective subfield.

1 4. (Original) The method of claim 3, with said controlling of the operation and non-operation
2 of the power recovery circuit comprising:

3 obtaining a line data variation between display data of each XY-electrode line pair to be
4 scanned first and display data of each XY-electrode line pair to be scanned next, for each of the
5 XY-electrode line pairs of a subfield to be displayed;

6 obtaining a sum of line data variations obtained for all of the XY-electrode line pairs of the
7 subfield to be displayed;

8 obtaining a cell data variation between the display cells corresponding to the line data
9 variation and adjacent display cells, for all of the XY-electrode line pairs of the subfield to be
10 displayed;

11 obtaining a sum of cell data variations obtained for all of the XY-electrode line pairs of the
12 subfield to be displayed;

13 adding the sum of line data variations and the sum of cell data variations to obtain a total of
14 data variations in the subfield to be displayed; and
15 operating the power recovery circuit when the total of data variations in the subfield to be
16 displayed exceeds a predetermined reference value.

1 5. (Original) The method of claim 4, with said obtaining of the line data variation comprising:
2 performing an exclusive OR operation on the display data of the XY-electrode line pair to
3 be scanned first and the display data of the XY-electrode line pair to be scanned next; and
4 setting the line data variation to be equal to number of 1s in data resulting from the exclusive
5 OR operation.

1 6. (Original) The method of claim 5, with said obtaining of the cell data variation comprising:
2 performing an AND operation on the display data of the XY-electrode line pair to be scanned
3 first and the data resulting from the exclusive OR operation to obtain a first variation data;
4 performing an AND operation on the display data of the XY-electrode line pair to be scanned
5 next and the data resulting from the exclusive OR operation to obtain a second variation data; and
6 obtaining number of bits of different data between the first variation data and the second
7 variation data and setting the obtained number as the cell data variation.

1 7. (Original) The method of claim 3, with said controlling of the operation and non-operation
2 of the power recovery circuit comprising:

3 counting number of display cells to be turned on corresponding to each of the XY-electrode
4 line pairs of a subfield to be displayed;
5 counting number of display cells to be turned off in adjacency of the display cells to be turned
6 on;
7 adding the number of display cells to be turned on and the number of display cells to be
8 turned off in adjacency of the display cells to be turned on; and
9 when the result of the addition exceeds a predetermined reference value, not operating the
10 power recovery circuit.

1 8. (Original) The method of claim 2, with said controlling of the operation and non-operation
2 of the power recovery circuit being performed for each of the XY-electrode line pairs in dependence
3 upon display data of an XY-electrode line pair to be scanned first and display data of an
4 XY-electrode line pair to be scanned next.

1 9. (Original) The method of claim 8, with said controlling of the operation and non-operation
2 of the power recovery circuit comprising:
3 obtaining a line data variation between the display data of the XY-electrode line pair to be
4 scanned first and the display data of the XY-electrode line pair to be scanned next;
5 obtaining a cell data variation between display cells corresponding to the line data variation
6 and their adjacent display cells;
7 adding the line data variation and the cell data variation to obtain a total of data variations;

8 and

9 when the total data variation exceeds a predetermined reference value, operating the power
10 recovery circuit.

1 10. (Original) The method of claim 9, with said obtaining of the line data variation
2 comprising:

3 performing an exclusive OR operation on the display data of the XY-electrode line pair to
4 be scanned first and the display data of the XY-electrode line pair to be scanned next; and
5 setting number of 1s in data resulting from the exclusive OR operation as the line data
6 variation.

1 11. (Original) The method of claim 10, with said obtaining of the cell data variation
2 comprising:

3 performing an AND operation on the display data of the XY-electrode line pair to be scanned
4 first and the data resulting from the exclusive OR operation to obtain a first variation data;
5 performing an AND operation on the display data of the XY-electrode line pair to be scanned
6 next and the data resulting from the exclusive OR operation to obtain a second variation data; and
7 obtaining number of bits of different data between the first variation data and the second
8 variation data and setting the obtained number as the cell data variation.

1 12: (Original) The method of claim 8, with said controlling of the operation and

2 non-operation of the power recovery circuit comprising:
3 counting number of display cells to be turned on corresponding to the XY-electrode line pair
4 to be scanned next;
5 counting number of display cells to be turned off in adjacency of the display cells to be turned
6 on;
7 adding the number of display cells to be turned on and the number of display cells to be
8 turned off in adjacency of the display cells to be turned on; and
9 when the result of the addition exceeds a predetermined reference value, not operating the
10 power recovery circuit.

1 13. (Original) The method of claim 2, further comprising:
2 classifying the address electrode lines into at least a first address electrode line group and a
3 second address electrode line group, the address driver including at least a first address sub-driver
4 and a second address sub-driver, the power recovery circuit including at least first power recovery
5 sub-circuit and a second power recovery sub-circuit, the first power recovery sub-circuit having an
6 output connected to a power supply voltage line of the first address sub-driver, the second power
7 recovery sub-circuit having an output connected to a power supply voltage line of the second address
8 sub-driver;
9 driving the first address electrode line group by the first address sub-driver; and
10 driving the second address electrode line group by the second address sub-driver.

1 14. (Original) The method of claim 13, with the operation and non-operation of the first
2 power recovery sub-circuit and the second power recovery sub-circuit being controlled for each
3 subfield in dependence upon the display data signals of the subfield.

1 15. (Original) The method of claim 14, with said controlling of the operation and
2 non-operation of the power recovery circuit comprising:

3 obtaining a first line data variation between display data of each XY-electrode line pair to
4 be scanned first and display data of each XY-electrode line pair to be scanned next, for the first
5 address electrode line group and each of the XY-electrode line pairs of a subfield to be displayed;

6 obtaining a second line data variation between display data of each XY-electrode line pair
7 to be scanned first and display data of each XY-electrode line pair to be scanned next, for the second
8 address electrode line group and each of the XY-electrode line pairs of the subfield to be displayed;

9 obtaining a first sum of line data variations obtained for the first address electrode line group
10 and all of the XY-electrode line pairs of the subfield;

11 obtaining a second sum of line data variations obtained for the second address electrode line
12 group and all of the XY-electrode line pairs of the subfield;

13 obtaining a first cell data variation between display cells corresponding to the line data
14 variation and adjacent display cells, for the first address electrode line group and all of the
15 XY-electrode line pairs of the subfield;

16 obtaining a second cell data variation between display cells corresponding to the line data
17 variation and adjacent display cells, for the second address electrode line group and all of the

18 XY-electrode line pairs of the subfield;
19 obtaining a first sum of cell data variations obtained for the first address electrode line group
20 and all of the XY-electrode line pairs of the subfield;
21 obtaining a second sum of cell data variations obtained for the second address electrode line
22 group and all of the XY-electrode line pairs of the subfield;
23 adding the first sum of line data variations and the first sum of cell data variations to obtain
24 a first total of data variations in the subfield;
25 adding the second sum of line data variations and the second sum of cell data variations to
26 obtain a second total of data variations in the subfield;
27 when the first total data variation of the subfield exceeds a predetermined reference value,
28 operating the first power recovery sub-circuit; and
29 when the second total data variation of the subfield exceeds a predetermined reference value,
30 operating the second power recovery sub-circuit.

1 16. (Original) The method of claim 14, with said controlling of the operation and
2 non-operation of the power recovery circuit comprising:
3 counting number of first display cells to be turned on corresponding to the first address
4 electrode line group and each of the XY-electrode line pairs of a subfield to be displayed;
5 counting number of second display cells to be turned on corresponding to the second address
6 electrode line group and each of the XY-electrode line pairs of the subfield to be displayed;
7 counting number of first adjacent display cells to be turned off in adjacency of the first

8 display cells to be turned on;

9 counting number of second adjacent display cells to be turned off in adjacency of the second

10 display cells to be turned on;

11 adding the number of the first display cells to be turned on and the number of the first

12 adjacent display cells to be turned off in adjacency of the first display cells to be turned on, to obtain

13 a first addition result;

14 adding the number of the second display cells to be turned on and the number of the second

15 adjacent display cells to be turned off in adjacency of the second display cells to be turned on, to

16 obtain a second addition result;

17 when the first addition exceeds a predetermined reference value, not operating the first power

18 recovery sub-circuit; and

19 when the second addition exceeds a predetermined reference value, not operating the second

20 power recovery sub-circuit.

1 17. (Original) The method of claim 13, with the operation and non-operation of the first

2 power recovery sub-circuit and the second power recovery sub-circuit being controlled for each

3 XY-electrode line pair in dependence upon display data of an XY-electrode line pair to be scanned

4 first and display data of an XY-electrode line pair to be scanned next.

1 18. (Original) The method of claim 17, with said controlling of the operation and

2 non-operation of the power recovery circuit comprising:

3 obtaining a first line data variation between the display data of the XY-electrode line pair to
4 be scanned first and the display data of the XY-electrode line pair to be scanned next, corresponding
5 to the first address electrode line group;

6 obtaining a second line data variation between the display data of the XY-electrode line pair
7 to be scanned first and the display data of the XY-electrode line pair to be scanned next,
8 corresponding to the second address electrode line group;

9 obtaining a first cell data variation between display cells corresponding to the first line data
10 variation and their adjacent display cells;

11 obtaining a second cell data variation between display cells corresponding to the second line
12 data variation and their adjacent display cells;

13 adding the first line data variation and the first cell data variation to obtain a first total of data
14 variations;

15 adding the second line data variation and the second cell data variation to obtain a second
16 total of data variations;

17 when the first total data variation exceeds a predetermined reference value, operating the first
18 power recovery sub-circuit; and

19 when the second total data variation exceeds a predetermined reference value, operating the
20 second power recovery sub-circuit.

1 19. (Previously Presented) The method of claim 17, with said controlling of the operation and
2 non-operation of the power recovery circuit comprising:

3 counting number of first display cells to be turned on corresponding to the first address
4 electrode line group and the XY-electrode line pair to be scanned next;
5 counting number of second display cells to be turned on corresponding to the second address
6 electrode line group and the XY-electrode line pair to be scanned next;
7 counting number of first adjacent display cells to be turned off in adjacency of the first
8 display cells to be turned on;
9 counting number of second adjacent display cells to be turned off in adjacency of the second
10 display cells to be turned on;
11 adding the number of the first display cells to be turned on and the number of the first
12 adjacent display cells to be turned off, to obtain a first addition result;
13 adding the number of the second display cells to be turned on and the number of the second
14 adjacent display cells to be turned off, to obtain a second addition result;
15 when the first addition result exceeds a predetermined reference value, not operating the first
16 power recovery sub-circuit; and
17 when the second addition result exceeds a predetermined reference value, not operating the
18 second power recovery sub-circuit.

1 20. (Original) The method of claim 2, with the operation and non-operation of the power
2 recovery circuit being controlled for each frame in dependence upon display data signals of the frame
3 composed of a plurality of subfields.

1 21. (Currently amended) A method of driving a plasma display apparatus, the method
2 comprising:

3 processing an address signal at an address driver to generate display data signals and applying
4 the display data signals to address electrode lines;

5 ~~controlling operation and non-operation of a power recovery circuit in accordance with the~~
6 ~~display data signals, said power recovery circuit being included in said address driver;~~

7 predicting a first addressing power of the plasma display apparatus during a non-operation
8 of a power recovery circuit and operating the power recovery circuit when the first addressing power
9 exceeds a first predetermined reference value;

10 predicting a second addressing power of the plasma display apparatus during an operation
11 of the power recovery circuit and not operating the power recovery circuit when the second
12 addressing power exceeds a second predetermined reference value;

13 collecting excess charges remaining in [[the]] display cells upon said operation of said power
14 recovery circuit at the end of said applying the display data signals, said collecting excess charges
15 being performed by said power recovery circuit; and

16 applying the collected charges to the display cells upon said operation of said power recovery
17 circuit at the start of said applying the data display data signals.

1 22. (Currently amended) The method of claim 21, further comprising:

2 uniformizing charges in display cells to be driven, said uniformizing corresponding to an
3 initialization step;

4 determining a charge state of display cells to be turned on and a charge state of display cells
5 to be turned off, said determining corresponding to an address step;

6 provoking the display cells to be turned on to perform a display discharge, said provoking
7 corresponding to a display-sustaining step; and

8 said uniformizing, determining, and provoking being performed in a unit subfield, the
9 operation and non-operation of the power recovery circuit being controlled in dependence upon the
10 display data signals applied to the address electrode lines in the address step.

1 23. (Previously Presented) The method of claim 22, with the operation and non-operation of
2 the power recovery circuit being controlled for each subfield in accordance with the display data
3 signals of the respective subfield.

1 24. (Previously Presented) The method of claim 22, further comprising:
2 classifying the address electrode lines into at least a first address electrode line group and a
3 second address electrode line group, the address driver including at least a first address sub-driver
4 and a second address sub-driver, the power recovery circuit including at least first power recovery
5 sub-circuit and a second power recovery sub-circuit, the first power recovery sub-circuit having an
6 output connected to a power supply voltage line of the first address sub-driver, the second power
7 recovery sub-circuit having an output connected to a power supply voltage line of the second address
8 sub-driver;

9 driving the first address electrode line group by the first address sub-driver; and

10 driving the second address electrode line group by the second address sub-driver.

1 25. (Currently amended) A display apparatus, comprising:

2 a plasma display panel comprising X-electrode lines, Y-electrode lines, and address
3 electrode lines, said X-electrode lines and said Y-electrode lines being alternately arranged in parallel
4 on a rear surface of a front transparent substrate to form XY-electrode line pairs, said address
5 electrode lines being arranged on a front surface of a rear transparent substrate to cross the XY-
6 electrode line pairs, with intersections of the XY-electrode line pairs and the address electrode lines
7 defining display cells;

8 a driving apparatus for driving said plasma display panel, said driving apparatus including
9 a video processor, a logic controller, an address driver, a X-driver, and a Y-driver, said address driver
10 generating display data signals, said display data signals being determined by a charge state of
11 display cells to be turned on and a charge state of display cells to be turned off; and

12 a power recovery circuit for collecting excess charges remaining in display cells and applying
13 the collected charges to said display cells, said power recovery circuit being included in said address
14 driver, ~~operation and non-operation of said power recovery circuit being controlled in dependence~~
15 upon ~~said display data signals:~~ said power recovery circuit being operated when a first addressing
16 power of the plasma display panel during non-operation of the power recovery circuit is predicted
17 to exceed a first predetermined reference value, said power recovery circuit not being operated when
18 a second addressing power of the plasma display panel during operation of the power recovery circuit
19 is predicted to exceed a second predetermined reference value.

1 26. (Previously Presented) The display apparatus of claim 25, with said driving apparatus
2 generating a first waveform for uniformizing charges in display cells and a second waveform for
3 provoking the display cells to be turned on to perform a display discharge.

1 27. (Previously Presented) The display apparatus of claim 26, with said power recovery
2 circuit being controlled by obtaining a line data variation and a cell data variation, said line data
3 variation being obtained between display data of each XY-electrode line pair to be scanned first and
4 display data of each XY-electrode line pair to be scanned next, said cell data variation being obtained
5 between display cells corresponding to the line data variation and adjacent display cells.

1 28. (Previously Presented) The display apparatus of claim 26, with said power recovery
2 circuit being controlled by counting number of display cells to be turned on and number of display
3 cells to be turned off in adjacency of the display cells to be turned on.